

SUBSTRATE FOR MAGNETIC RECORDING

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Abstract of JP11126324

PROBLEM TO BE SOLVED: To obtain high strength and high rigidity and to improve surface smoothness by constituting a substrate of a composite layer of a sheet formed body comprising two-dimensionally arranged heat-resistant inorg. long fibers and a matrix glass, and a vitreous surface layer of specified thickness covering the surface of the composite layer. **SOLUTION:** A sheet formed body is obtd. by two-dimensionally arranging heat-resistant inorg. long fibers such as alumina, silica, silicon carbide, Tyranno, carbon, zirconia, silica-alumina fiber or the like. The sheet formed body is impregnated with a soln. of glass precursors such as aq. solns. or org. solvent solns. of metal alkoxides, nitrates, acetates, chlorides, carbonates and hydroxides, and silica sol and alumina sol to obtain a preformed body. Then the body is calcined at ≥ 500 deg.C to fill vacancies in the sheet formed body with the glass produced from the glass precursor. Then a vitreous smooth surface layer of 10 to 20 μ m thickness is formed by grazing, sputtering, vacuum vapor deposition, ion plating or the like.

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Claims:

[Claim 1]

A substrate for a magnetic recording medium, characterized in that the substrate comprises:

a composite layer of a matrix glass and a sheet-shaped molded product wherein heat-resistant inorganic filaments are arranged two-dimensionally, and

a glass surface layer that covers the surface of the composite layer and has a thickness of 0.3 to 600 μm , and that

at least a part of the matrix glass is constituted with a fired product of a glass precursor.

[Claim 2]

The substrate for a magnetic recording medium according to claim 1, characterized in that the layer of the matrix glass is formed by repeating plural times an immersing treatment with a glass precursor solution and a drying treatment.

[Claim 3]

The substrate for a magnetic recording medium according to claim 1 or 2, characterized in that the layer of the matrix glass is formed using the glass precursor solution to which a glass fine powder is added.

[Claim 4]

The substrate for a magnetic recording medium according to any one of claims 1 to 3, characterized in that the surface roughness R_{max} is 0.002 to 0.1 μm .

[0021]

[Examples]

Example 1

(1) A glass precursor solution was prepared by adding and mixing the prescribed amount of each alkoxide of silicon, boron, and sodium, water for hydrolysis, and ethyl alcohol as a solvent and by concentrating the mixture thereof so that the resultant glass composition contained 75 wt% of SiO_2 , 19 wt% of B_2O_3 and 6 wt% of Na_2O .

(2) Two sheets of cloths of alumina fibers were overlapped, and the overlapped sheet was immersed into the glass precursor solution obtained in

the above step (1), and then dried. This treatment was repeated 6 times to give a preform.

(3) The preform obtained in the above step (2) was fired in the air at 750°C under increased pressure so that a fired composite was obtained.

(4) The glass precursor solution obtained in the above step (1) was spin-coated on both surfaces of the fired composite obtained in the above step (3). Then, the fired composite was dried and fired in the air at 750°C so that a smooth glass surface layer having thickness of 140 μm was formed.

(5) The substrate obtained in the above step (4) was polished using abrasive grains of Al_2O_3 and a lapping machine, and a fiber-reinforced glass substrate of the present invention with R_{max} of 0.01 μm was prepared.

[0022]

A test for mechanical properties was carried out on the substrate thus obtained, and the substrate showed a tensile strength of 63 kg/mm^2 and a Young's modulus of 8600 kg/mm^2 . It was therefore confirmed that the obtained substrate is a fiber-reinforced glass substrate which has a high strength, Young's modulus and surface smoothness, required for a substrate for a magnetic disk.

[0023]

Example 2

(1) A glass precursor solution was prepared by adding and mixing the prescribed amount of each alkoxide of silicon, boron, and lead, water for hydrolysis, and ethyl alcohol and an organic acid as a solvent, by adding the same glass fine powder as described above (300 mesh) in an amount of 10 wt%, and by concentrating the mixture thereof so that the resultant glass composition contained 70 wt% of SiO_2 , 18 wt% of B_2O_3 and 12 wt% of PbO .

(2) Two sheets of cloths of silicon carbide fibers were overlapped, and the overlapped sheet was immersed into the glass precursor solution obtained in the above step (1), and then dried. This treatment was repeated 2 times to give a preform.

(3) The preform obtained in the above step (2) was fired in the air at 700°C under increased pressure so that a fired composite was obtained.

(4) The glass precursor solution obtained by the operation before adding the glass fine powder in the above step (1) was spin-coated on both surfaces of the fired composite obtained in the above step (3). Then the fired composite was dried and fired in the air at 700°C so that a smooth glass surface layer

having thickness of 180 μm was formed.

(5) The surface of the substrate was polished in a manner similar to Example 1, and a fiber-reinforced glass substrate of the present invention with R_{max} of 0.03 μm was prepared.

[0024]

A test for mechanical properties was carried out on the substrate thus obtained, and the substrate showed a tensile strength of 58 kg/mm^2 and a Young's modulus of 8100 kg/mm^2 . It was therefore confirmed that the obtained substrate is a fiber-reinforced glass substrate which has a high strength, Young's modulus and surface smoothness, required for a substrate for a magnetic disk.